

Vision

Integrating Remote Sensing and GIS....
opening the world to everyone





Our Goals

- [illegible]

2

Geography — Exploring and Describing Our World



Robert E. Peary



David Livingstone

Greely Adolphos Washington



Sir Edmund Hillary



Jane Goodall



Henry Morton Stanley



Cynthia Moss



Sylvia Earle

Creating Better Understanding

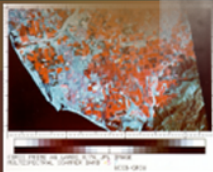
Computational Geography

The Blending of Computers, Mapping and Geographic Science

John Borchert
Modeling



Roger Tomlinson
Father of GIS



David Simonett
Remote Sensing



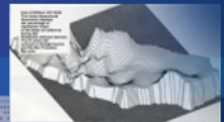
Waldo R. Tobler
First Law of Geography



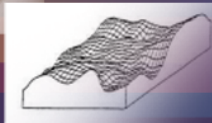
Carl Steinitz
Geodesign



Duane Marble
Designing GIS

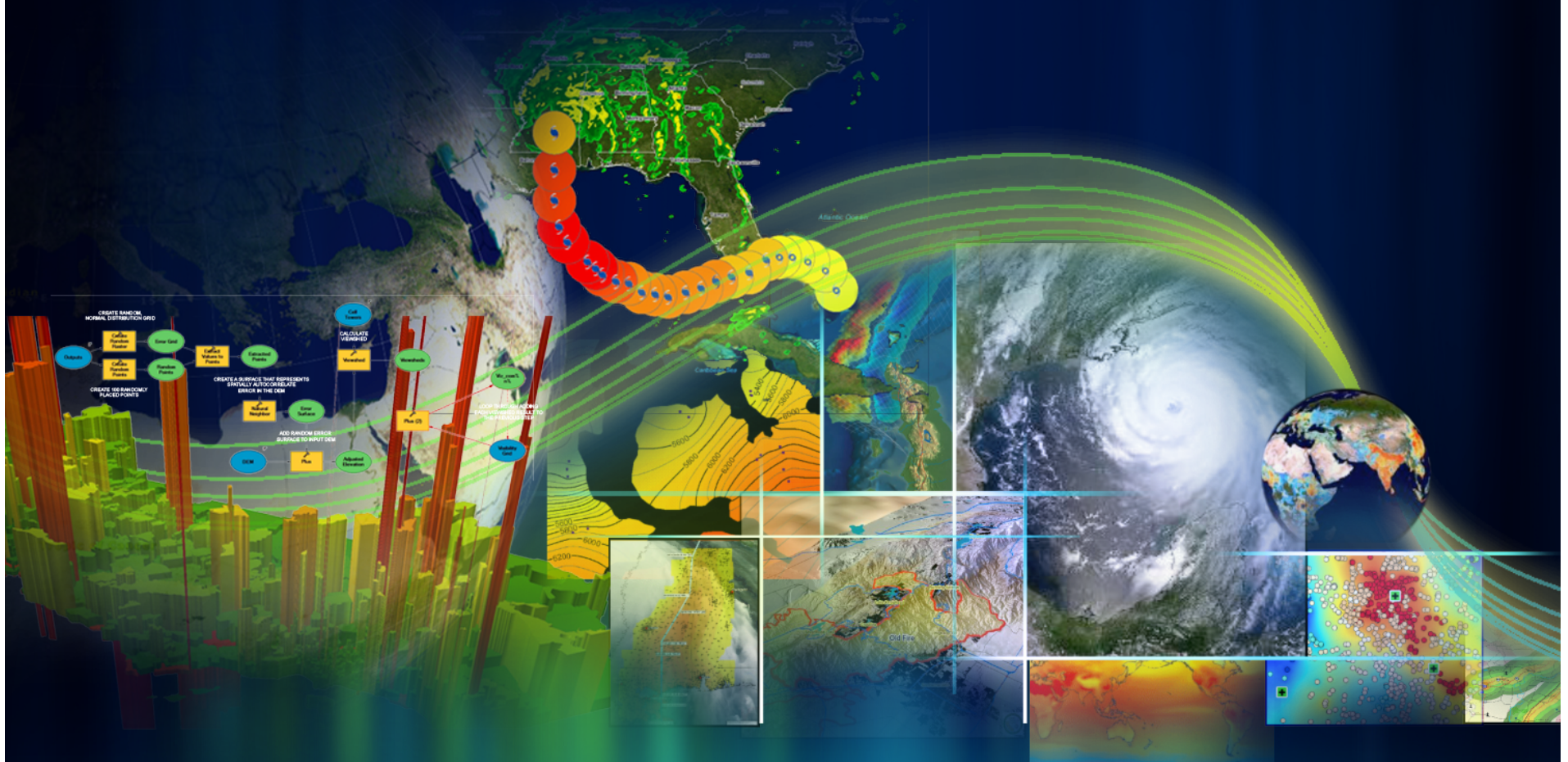


$$\left(\frac{dS}{ds}\right)^2 = g_x^2 \cos^2 a + 2 g_{xy} \sin a \cos a + g_y^2 \sin^2 a$$



*A New Kind of Exploration . . .
. . . Driven by Curiosity and Application*

GIS Provides A Framework For Measurement, Quantification, Analysis, Modeling . . .



Opening Our World To New Forms Of Exploration....
...And Application of Our Collective Knowledge

Our World Has Many Spatial Problems to Solve

- Human Population
- Understanding Environmental Change
- The Role of Biodiversity
- Global Climate Change
- Globalization
- Shifts in Urbanization
- Making Cities Livable
- Ending Poverty and Hunger
- Sustainable Development
- Clean Energy
- Ecosystem Conservation and Restoration
- Environment and Human Health



We Need Better Understanding . . .

. . . And A System That Can Integrate This Understanding Into Everything We Do

GIS Is Changing How We Work

- Systematic
- Holistic
- Analytic
- Quantitative
- Visual



GIS is Successful

Thousands of Applications . . .



Military

Homeland Security



Facility Management

Drinking water



US EPA

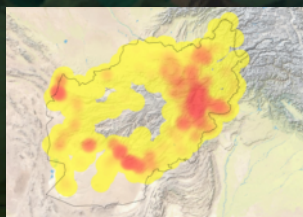
Housing Foreclosure



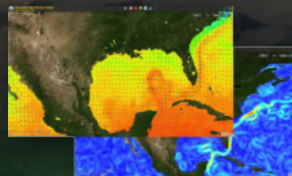
Agriculture



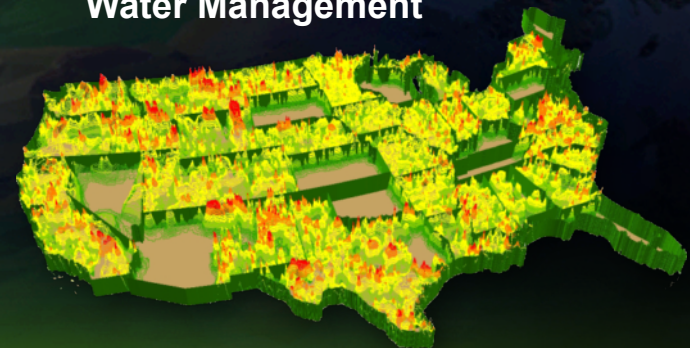
Humanitarian Affairs



Modeling Oceans



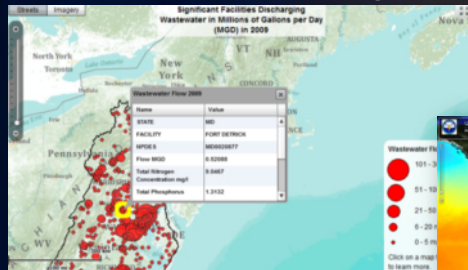
Water Management



. . .Improving Efficiency, Communication and Decision making

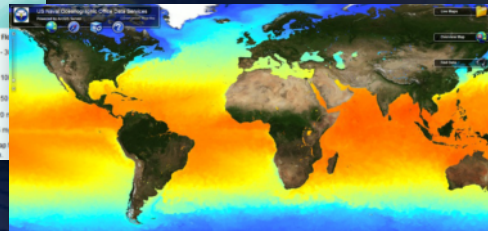
Environmental Change

Performance Management



Chesapeake Bay

Sea Surface Temperature



Naval Oceanographic Office

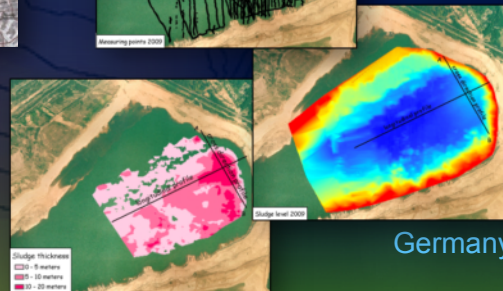
Ocean Monitoring



San Diego

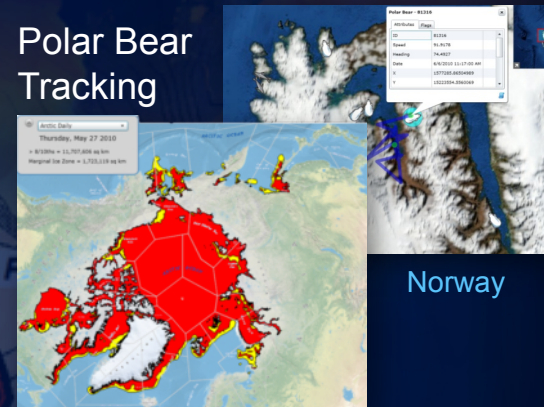


Coal Mine Sludge



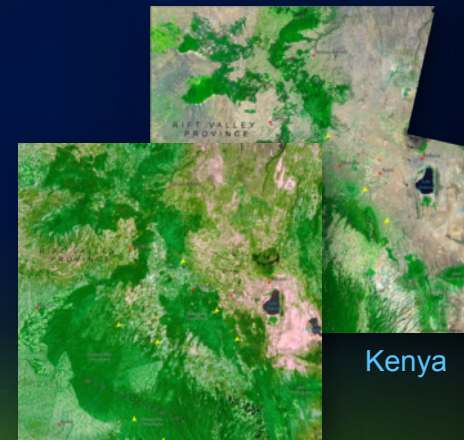
Germany

Polar Ice Change



Norway

Forest Changes



Kenya

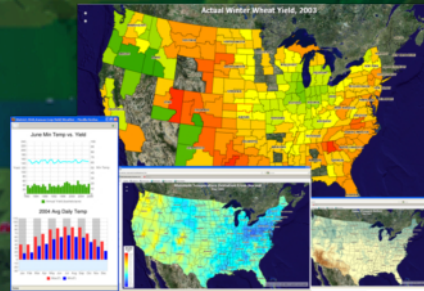
Natural Resource Management

Carbon Accounting



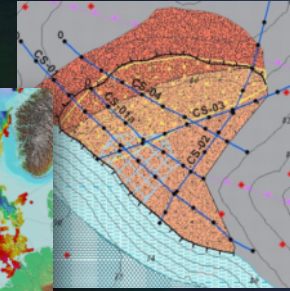
Australia

Agriculture Production



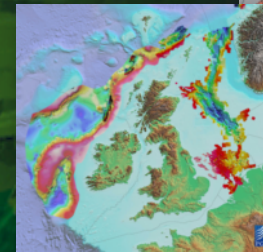
United States

Surficial Geology



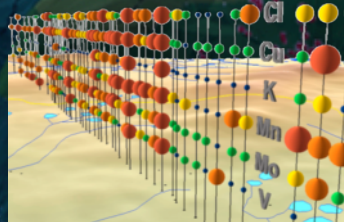
Antarctica

Exploration Geology



Northern Europe

Geochemical Visualization



Alaska

Wetlands



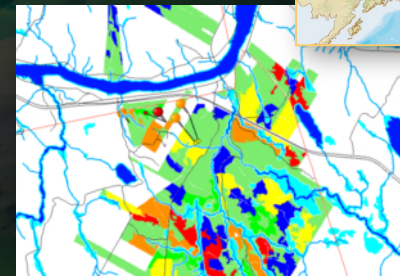
United States

Children's Forest



United States

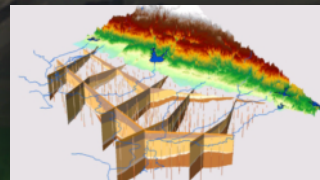
Forest Carbon Management



Canada

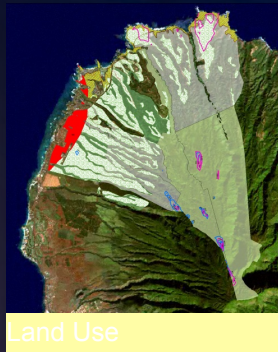
Petroleum Exploration

Columbia



California

Renewable Energy



Renewable
Energy
Planning

Maui, HI

Slope

Solar
Assessment-LIDAR



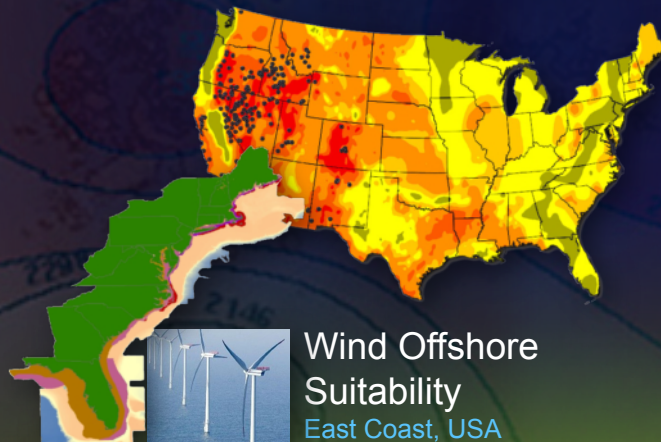
San Jose, CA

Solar Rooftop Model



North Vancouver

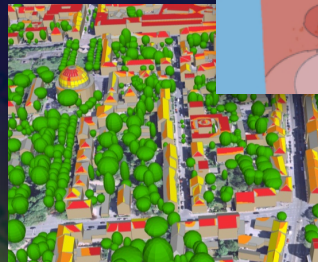
Geothermal Resources



Wind Offshore
Suitability

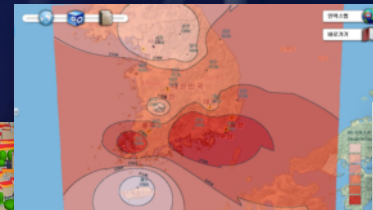
East Coast, USA

Solar
Potential



Darmstadt, Germany

Renewable
Energy Potential



South Korea

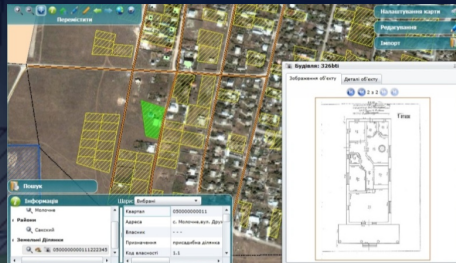
Hydro Power
Potential



Mexico

Land Information Management

Multipurpose Cadastral System



Ukraine

Property Tax Assessment



Houston, TX

Online Development Submissions



Ireland

Land Info Systems



Hong Kong

Parcel Notification



Berkeley, CA

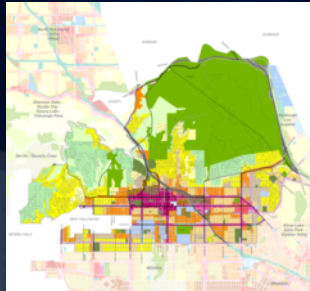
Online Auditor



Ohio

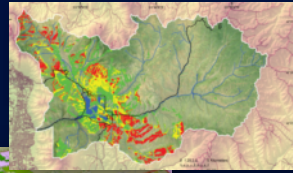
Urban Planning and Design

General Plan



Hollywood, CA

Visual Impact Studies



Utah

Zoning



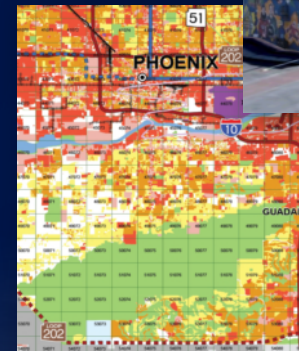
Elwood, IN

Urban Design



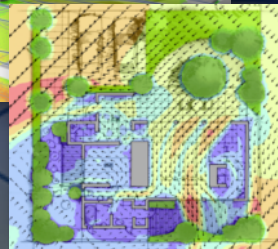
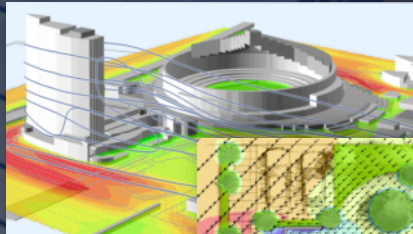
Aurora, Canada

Land Use



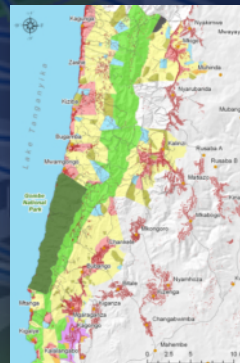
Phoenix, AZ

Wind Modeling



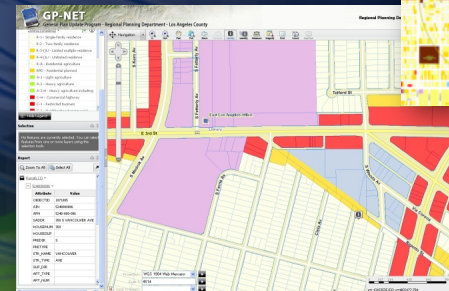
Fukuoka City, Japan

Villages and Conservation



Gombe, Tanzania

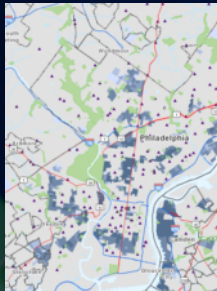
Web-Based General Plan Update



Los Angeles, CA

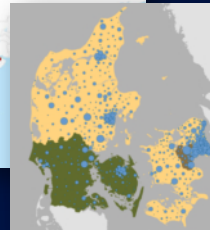
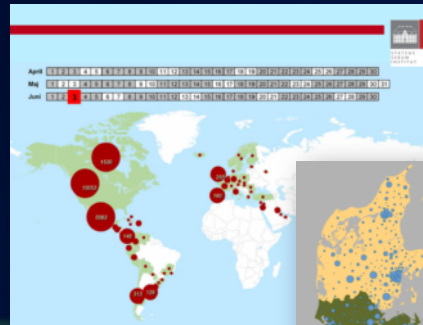
Public Safety, Health, and Social Issues

Accessibility to Healthy Foods



Philadelphia, PA

H1N1 Epidemic Tracking



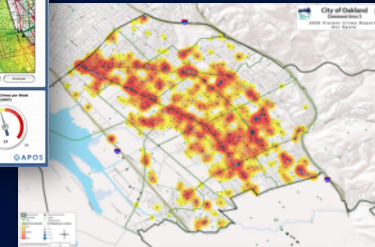
Denmark

Crime and Policing



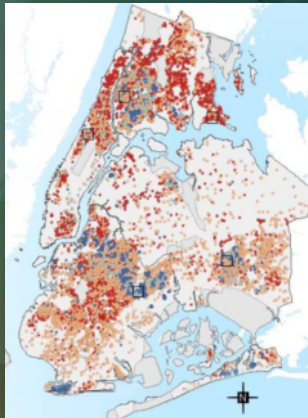
London

Crime Hotspots

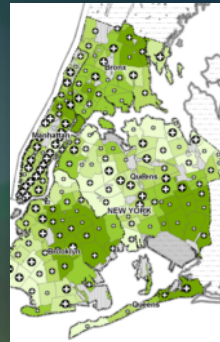


Oakland, CA

Public Housing and Social Risk



Race and Health care



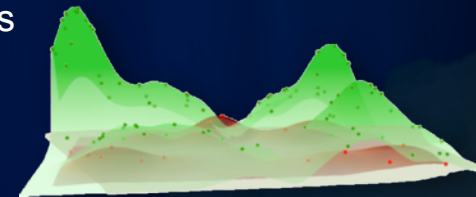
New York City, NY

Childhood Obesity



United States

Foreclosure Analysis



Dallas, TX

911

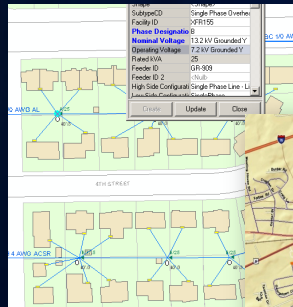


Delaware



Managing Utilities and Public Infrastructure

Electrical Network



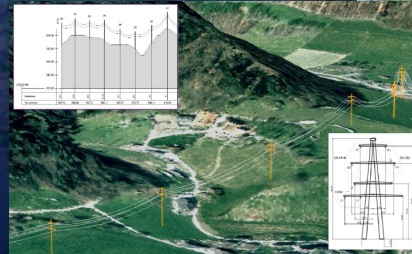
Telvent

Pipeline Risk



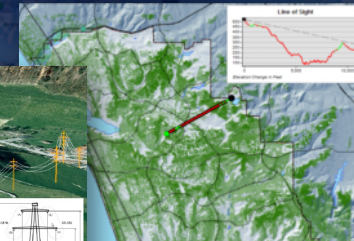
Pennsylvania

Transmission Line Design



Switzerland

Broadband Coverage



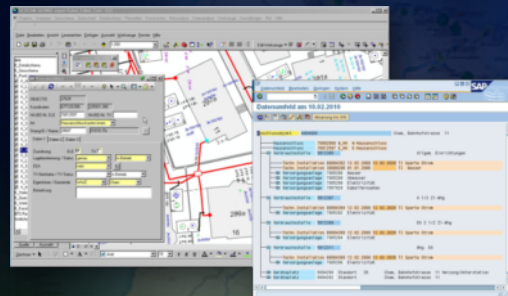
Carlsbad, CA

Natural Gas



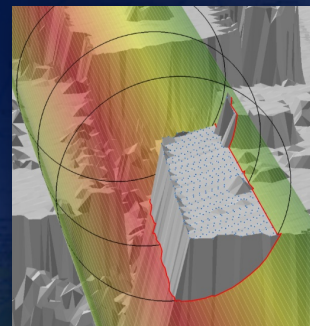
Europe

Multi Utility Management



Zug, Switzerland

3D Microwave Obstruction Analysis



Texas

Infrastructure



Nanjing, China

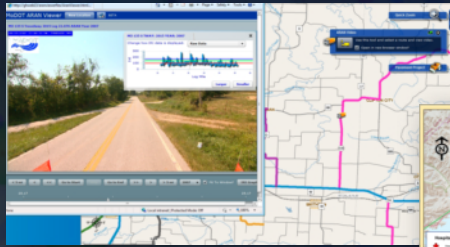
Sewer Lines



Boston, MA

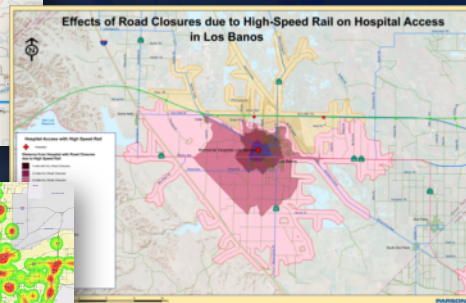
Transportation

Highway Management



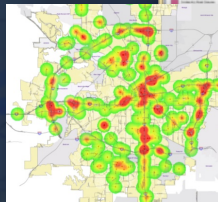
Missouri

High Speed Rail and Hospital Access



California

Traffic Analysis



Texas

Design Engineering



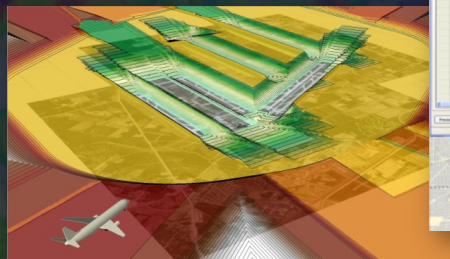
South Korea

Transit Planning



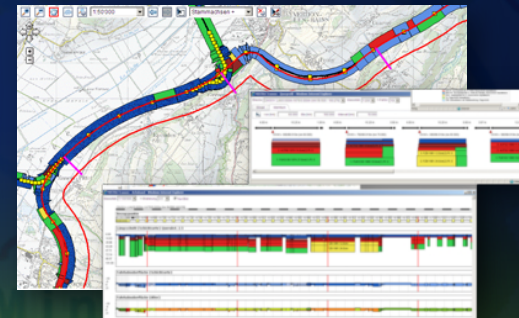
Copenhagen

Airport Management



Texas

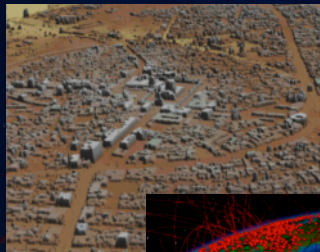
Linear Referencing



Switzerland

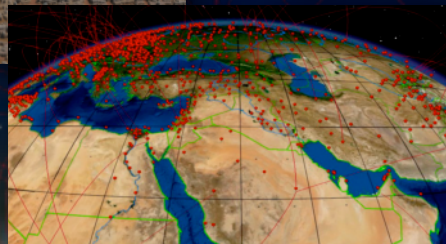
Defense and National Security

LIDAR Image



Iraq

Global Visualization



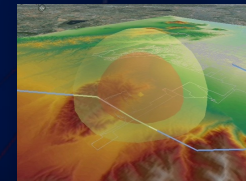
Middle East

Protecting Critical Infrastructure

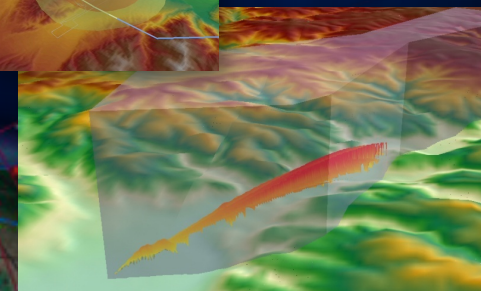


United States

Threat Analysis



Trajectory Modeling



NATO – Germany

Regional Visualization



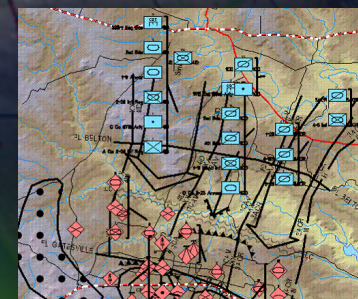
Afghanistan

Enterprise GIS



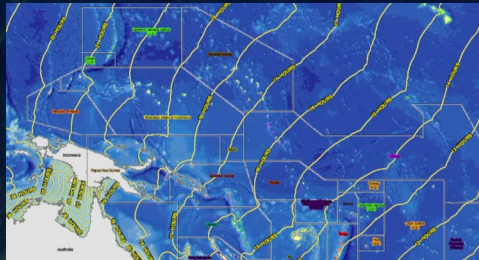
NATO

Military Cartography



Planning for and Responding to Natural Disasters

Tsunami Modeling



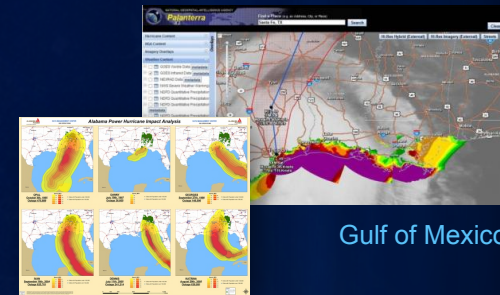
South Asia

Forest Fire History



California

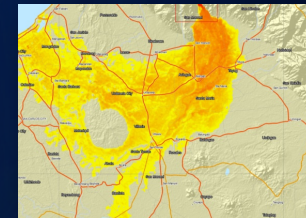
Hurricane



Gulf of Mexico

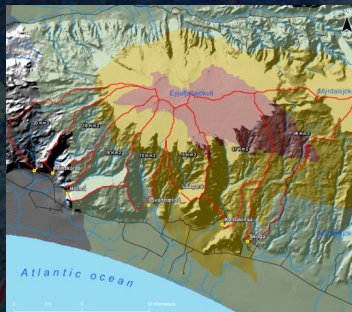
Alabama

Dam Failure



Luzon, Philippines

Volcanic Eruption



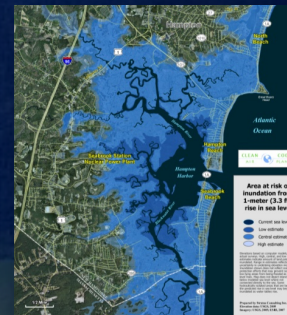
Eyjafjallajökull, Iceland

Flooding



Nashville, Tennessee

Sea Level Rise



New Hampshire

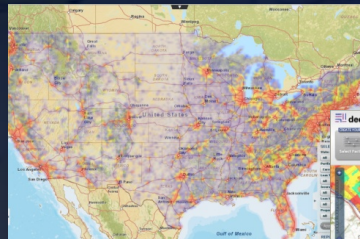
Earthquake



Haiti

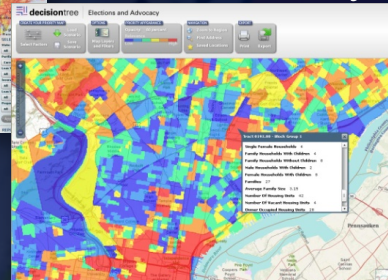
Business and Economic Development

Insurance Risk Analysis



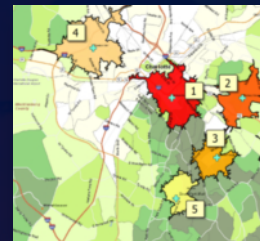
United States

Online Socio/Economic Analysis



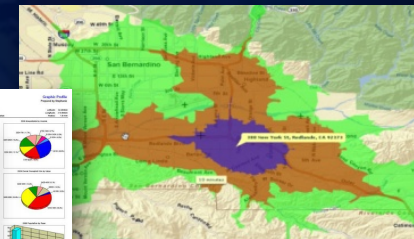
Philadelphia, PA

Site Selection



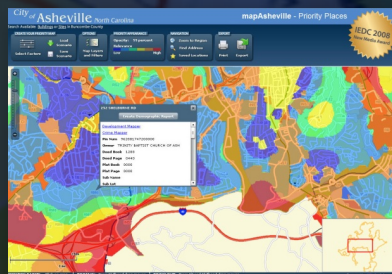
Charlotte, NC

Online Commercial Real Estate



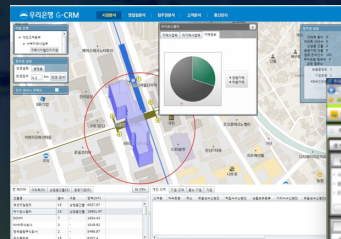
United States-STDB

Business Site Selection



Ashville, NC

Business Analysis



South Korea

Industrial Site Suitability



Government Transparency, and Citizen Engagement

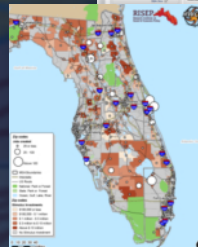
State
Expenditures



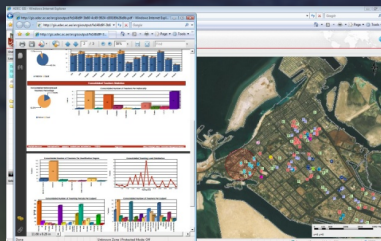
Maryland

Stimulus
and Jobs
Creation

Florida



School Evaluation



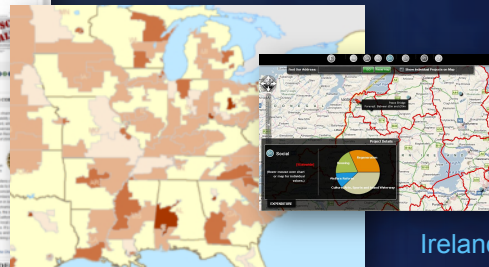
Abu Dhabi

Stimulus Funding



Recovery.gov

TARP Mapping



United States

Ireland

E 311

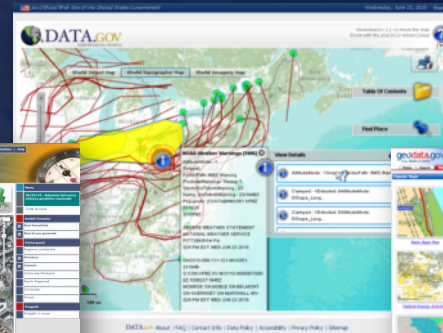


New Jersey

Lithuania



Government Portals

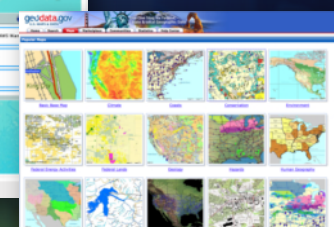


Data.gov, USA

Lombardy, Italy

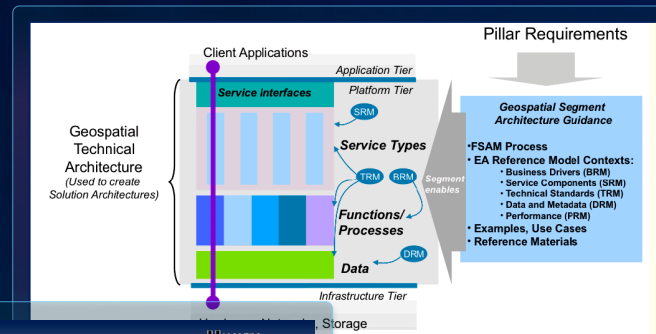


Geodata.gov

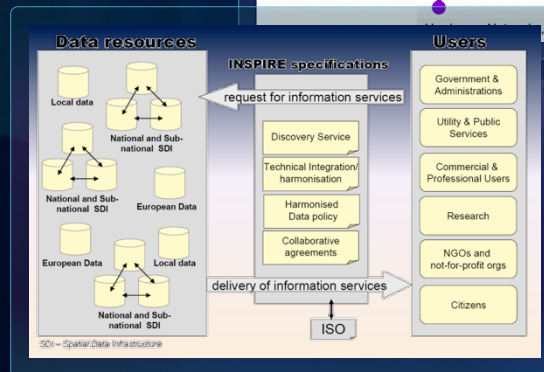


GIS as National Government Infrastructure

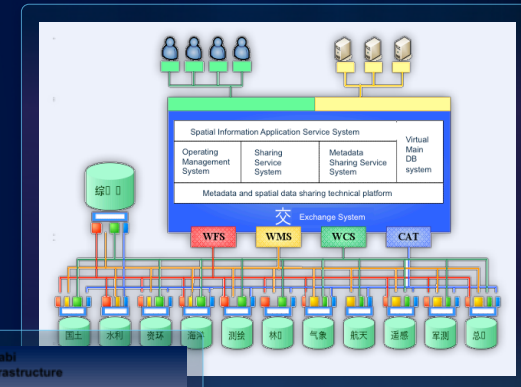
Geospatial Platform – USA



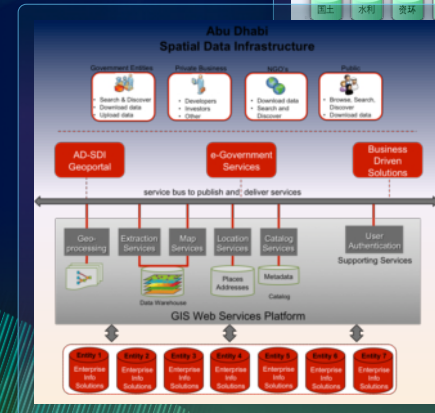
INSPIRE – EU



China



Abu Dhabi



Is GIS Possible on a Global Scale?



*Leveraging Our Collective Geospatial Investments . . .
... Making Maps and Geospatial Knowledge Available to Everyone*

Many Forces Are Converging

Enabling a Pervasive Geospatial society

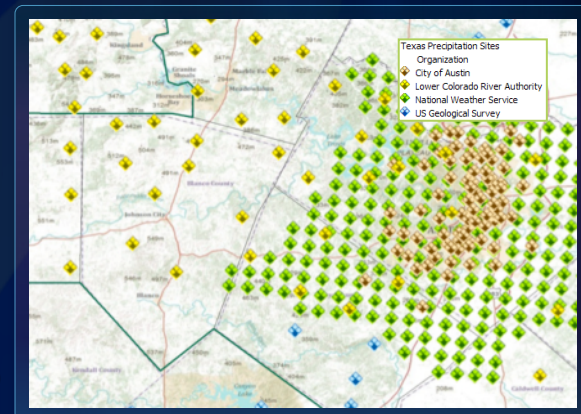
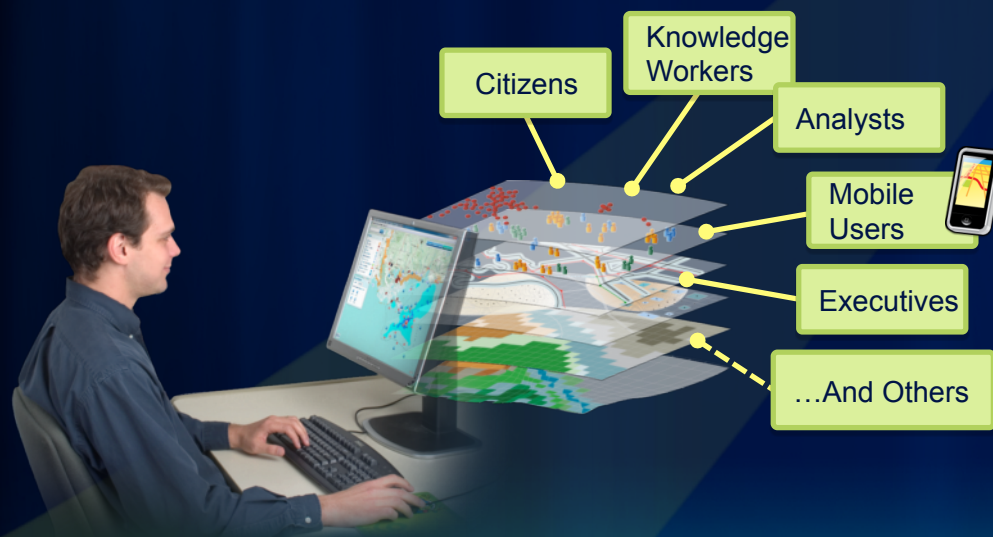


... Creating greater consciousness and collaboration

Many Professionals are Building The Knowledge

And Increasingly Making it Available

- Sharing Data
- Publishing Maps and Geo-Apps
- Developing Collaborative Approaches

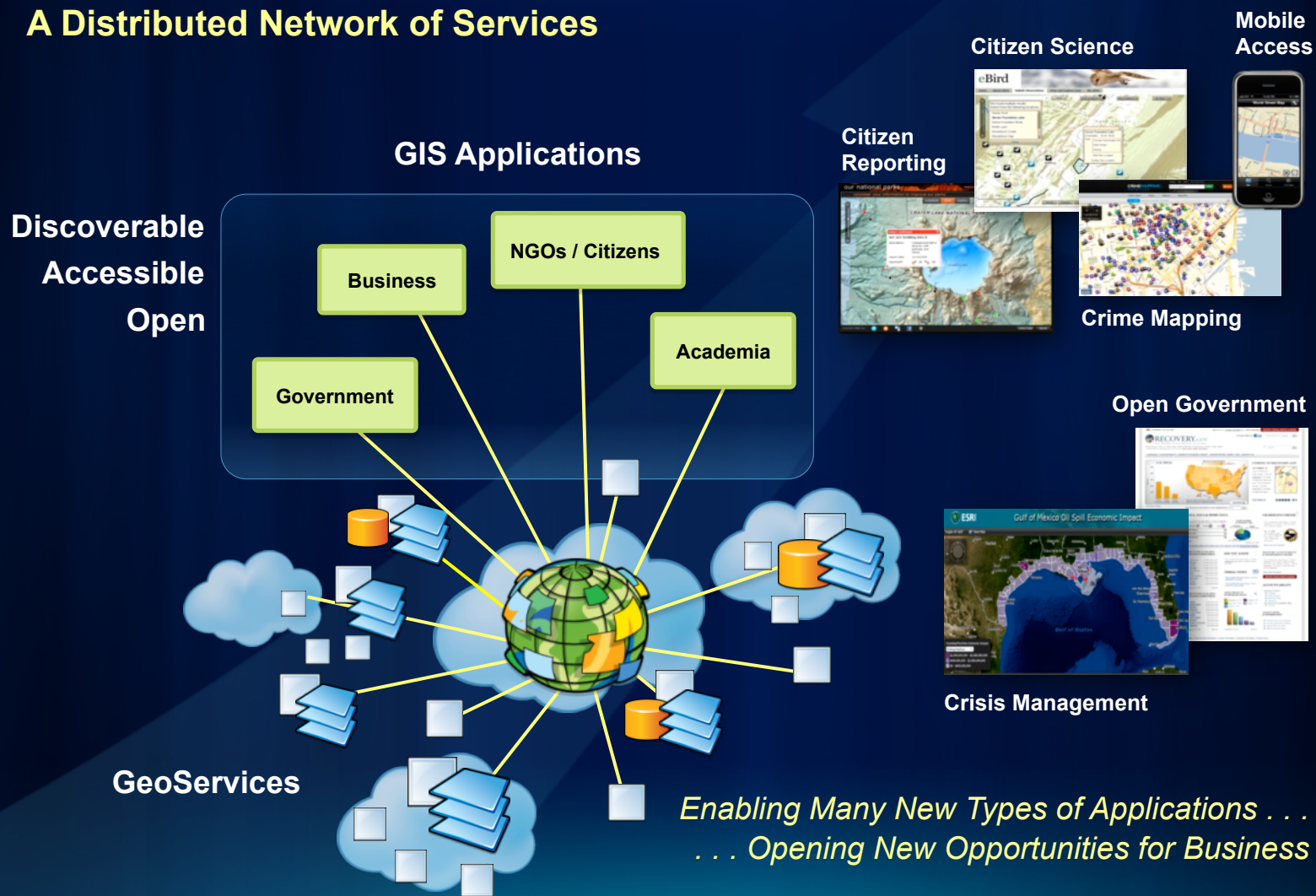


Real Time Multi Sensor Integration

... Using Maps as a Language to Engage Everybody

A Web-Based Geospatial Framework Is Emerging

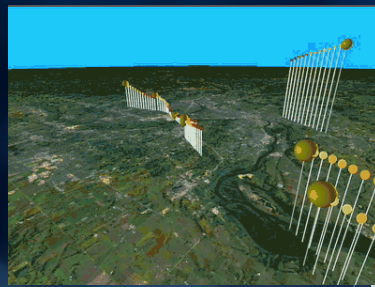
A Distributed Network of Services



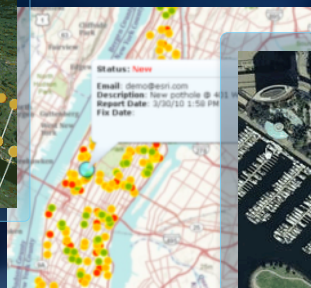
Social Media and Real-Time Feeds Are Part of the Framework

Creating New Sources of Geospatial Information

Sensor Networks



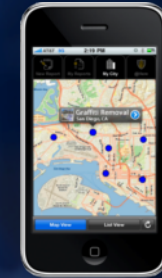
Volunteered Geographic Information (VGI)



Twitter



Social Media



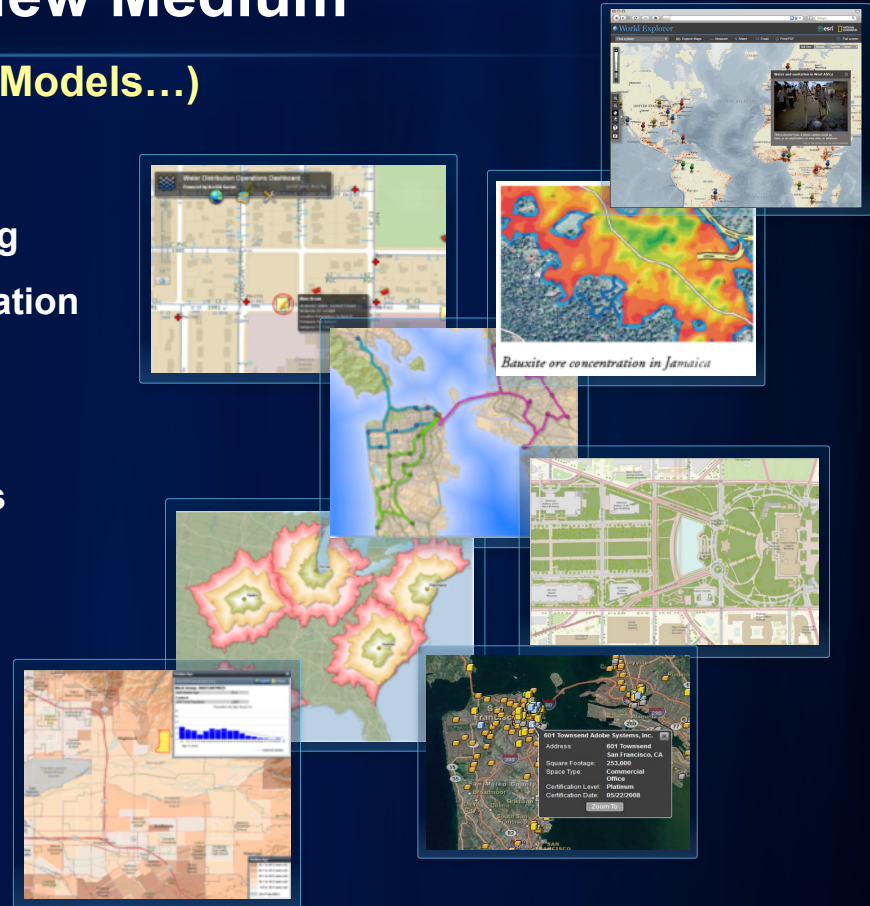
Community Awareness



Enriching GIS Systems with
Diverse Observations,
Perceptions and Dynamic Data

... Creating New Opportunities and Challenges

For Integrating Services (Data, Maps, Models...)



... Communicating Geographic Understanding to Everyone

These Trends Will Change How We Work

More Integrative...



More Transparent...



More Collaborative...



Shared Infrastructure...

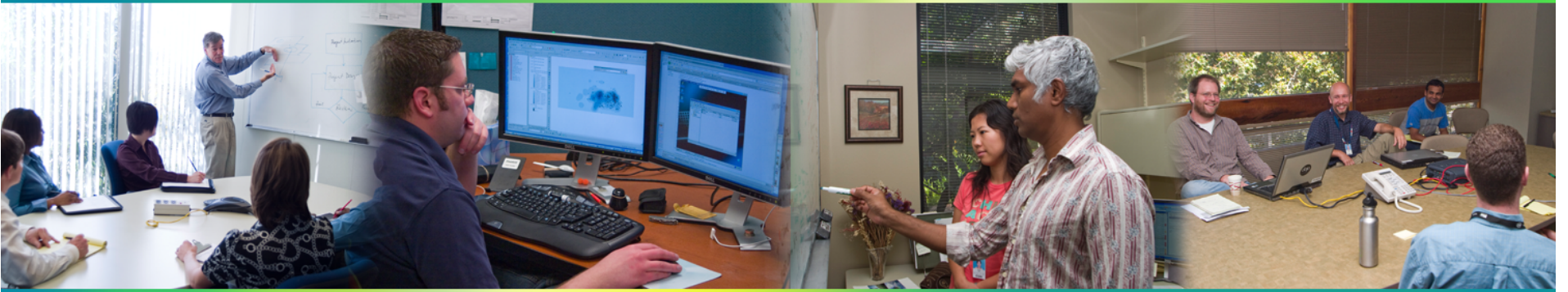


More Real-time...



*Easier, More Fun and Productive . . .
... Providing a Framework for More Efficient Organizations*

Creating an Enabling Geospatial Platform



Geospatial Technology Is Evolving Rapidly

Changing How We Do GIS

Social Networks • Geospatial Platform • Location Based Services
Sharing • Visualization • Crowd Sourcing • Transparency • Standards • Content
• Mapping • Hosting • Science • Templates • Common Infrastructure
Cloud • The Web • Mobility • Data Management • Education

Integration of Imagery and Remote Sensing

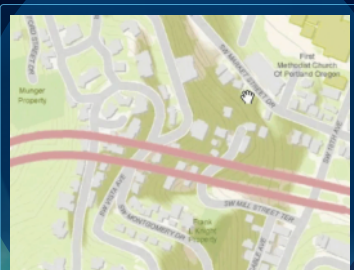
Workflow • Portals • Facility Management • Data Quality
Crowd Sourcing • Web-Based • 3D • Discovery • GIS Solutions
Standards • Applications • Place-Based • Temporal • Open Data
Very Large Spatial Databases • Networks • Security
Basemaps • VGI • User Experience
Citizen Engagement • Geo Services • Access • Generalization

... Empowering Many Participants

Hundreds of Improvements

Making GIS Easier & More Productive

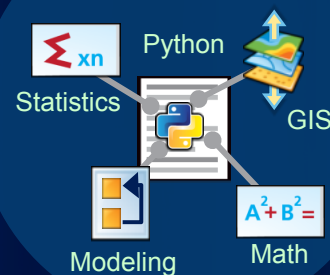
Fast Map Display



Template Based Editing



Integrated Scientific Programming



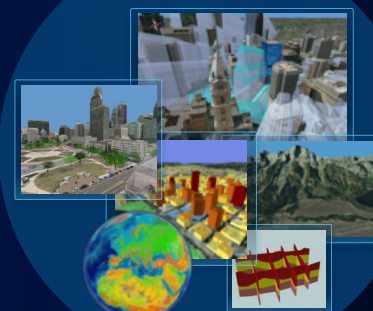
Time Aware



Advanced Spatial Analysis



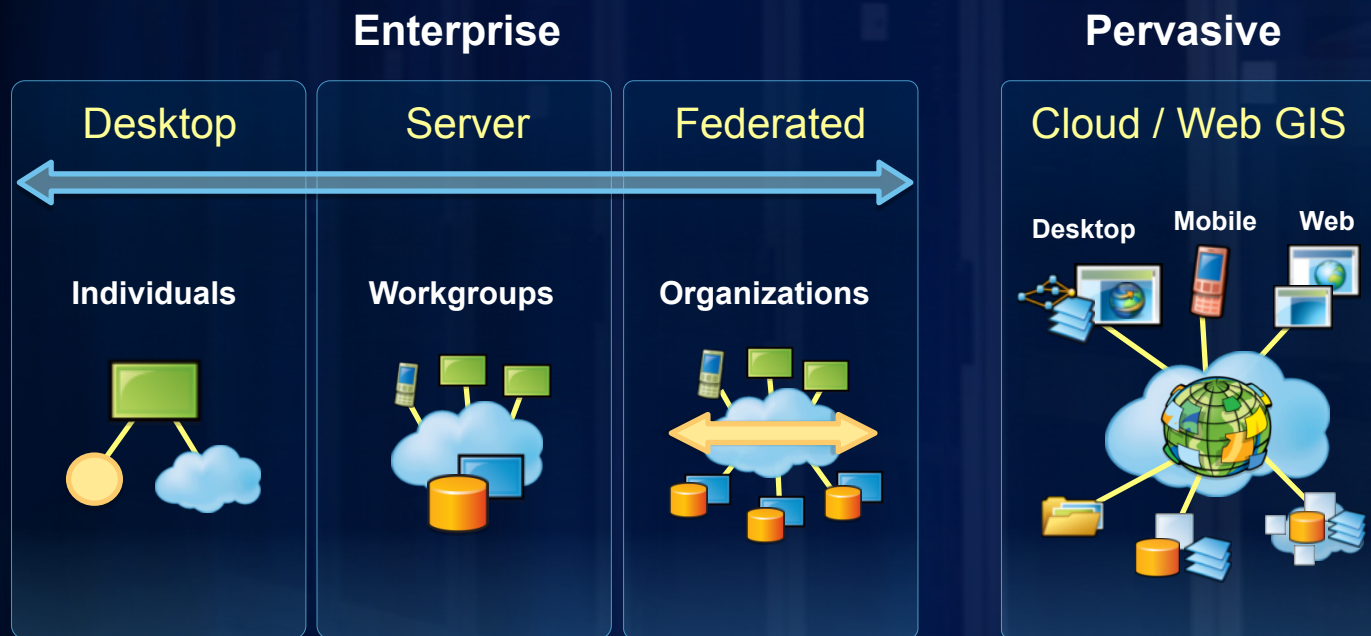
3D GIS



...And a Strong Platform

GIS Supports Multiple Implementation Patterns

Including Emerging IT Platforms

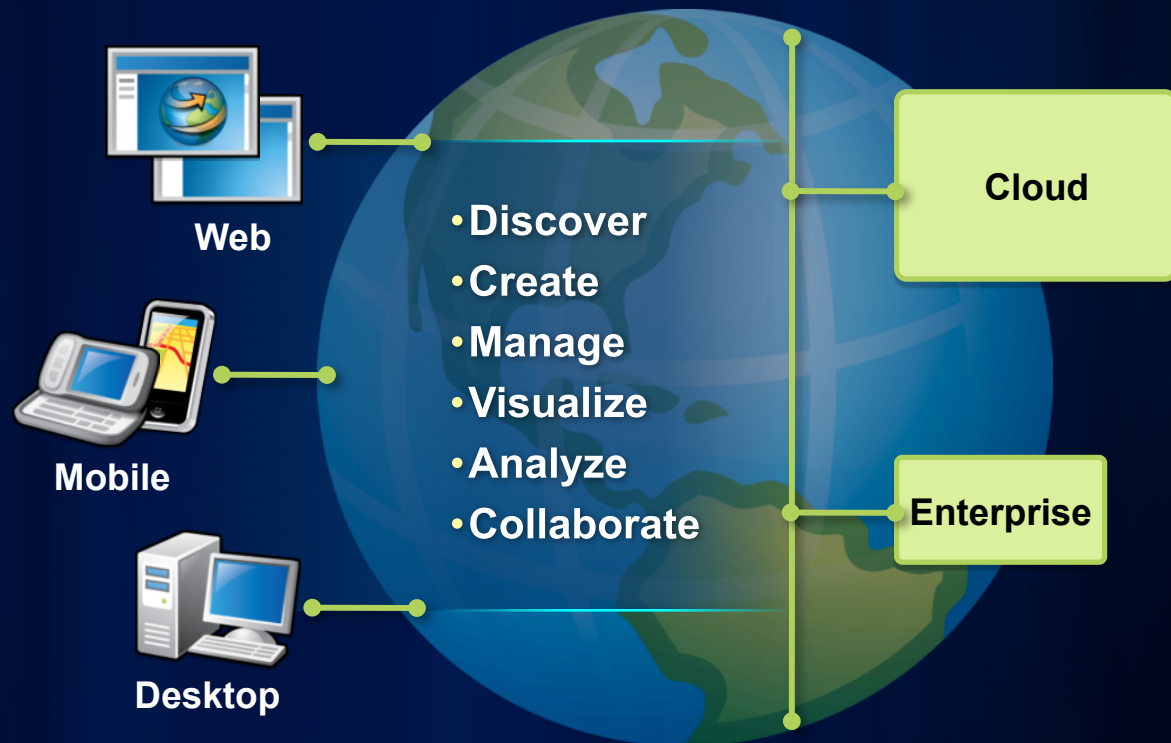


emerging

Vision- *Integration of All These Patterns*

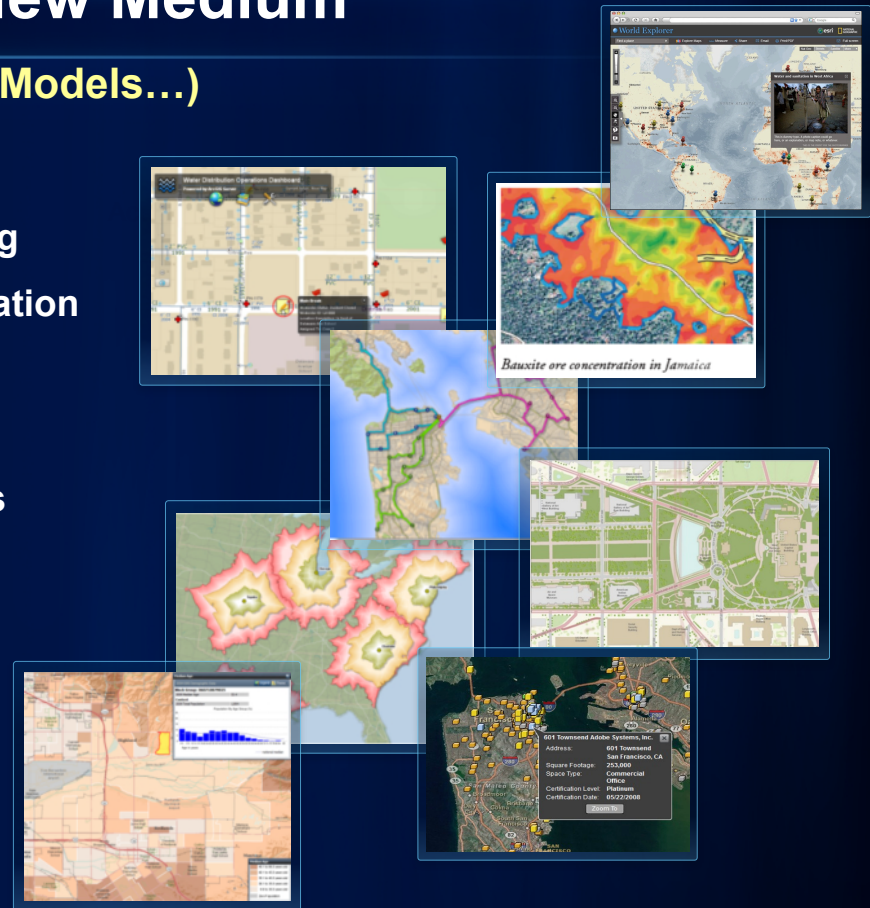
Providing a Complete Geospatial Platform

- Easy
- Powerful
- Everywhere



Creating a Bridge Between Enterprise and Pervasive GIS

For Integrating Services (Data, Maps, Models...)



... Communicating Geographic Understanding to Everyone

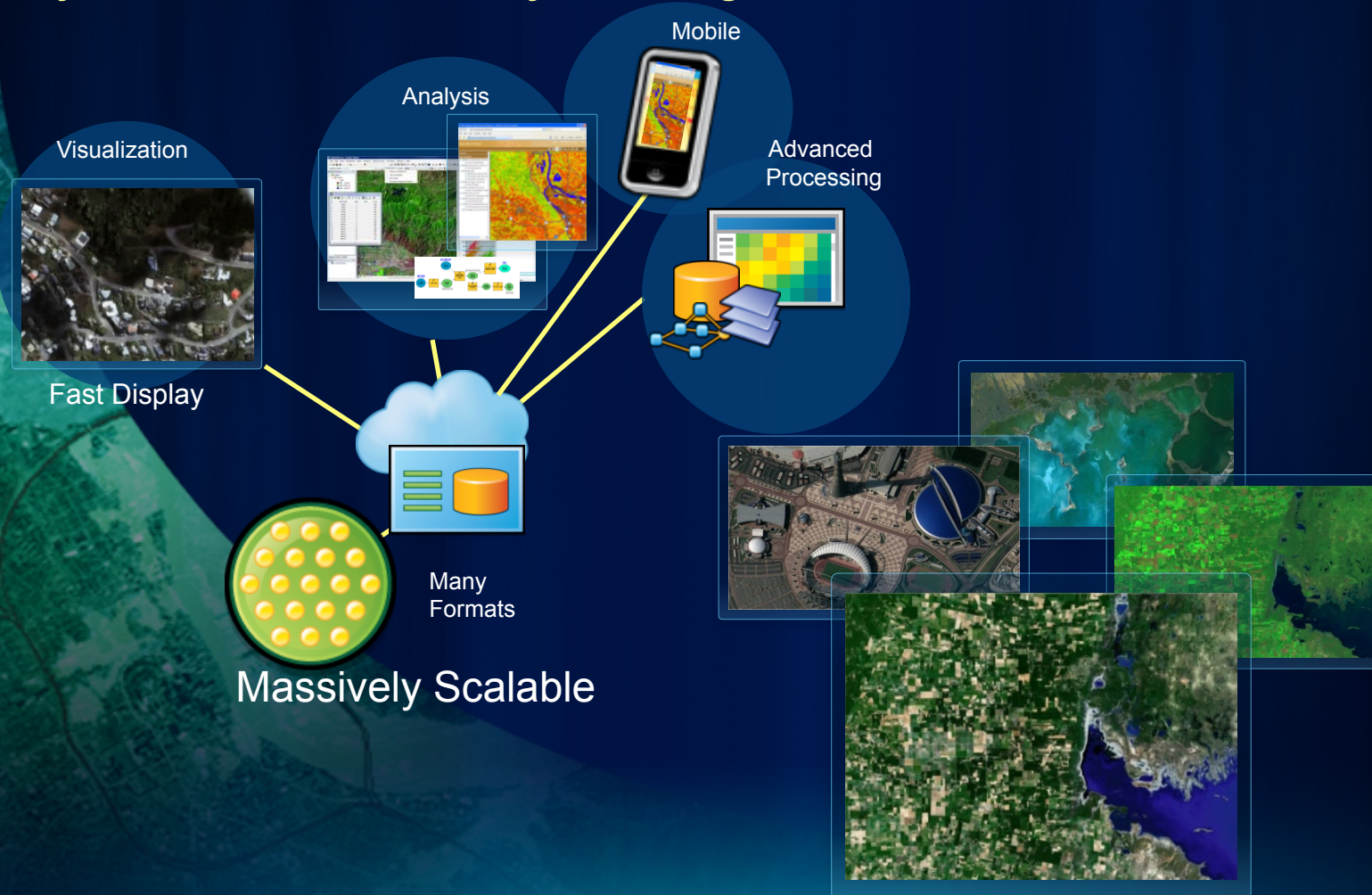
Web Maps Can Be Shared Across Devices



... Enhancing Access and Collaboration

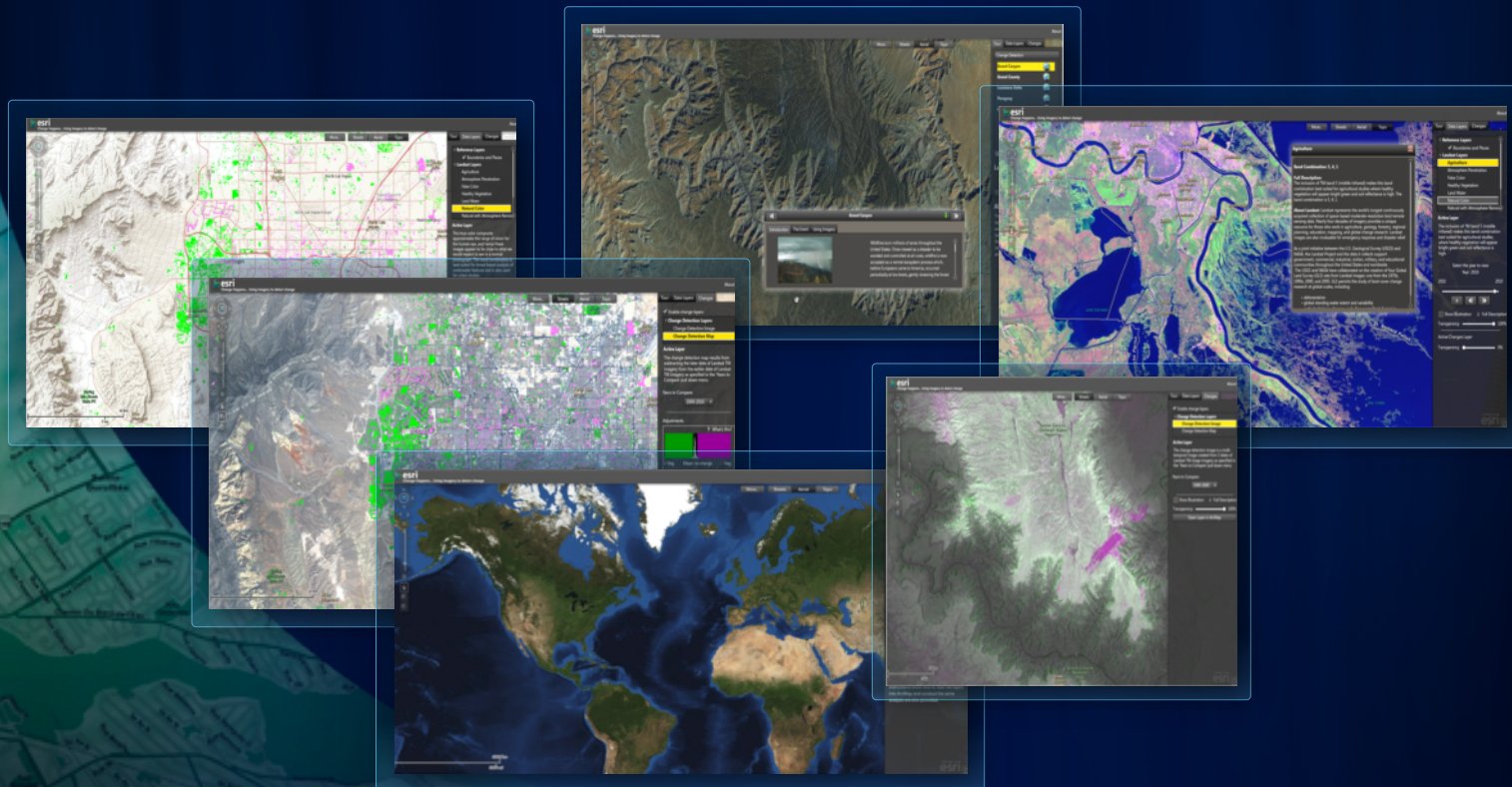
Imagery And Remote Sensing Are Integrated

Dynamic Visualization, Analysis, Management and Dissemination



Change Matters - Global Landsat Services

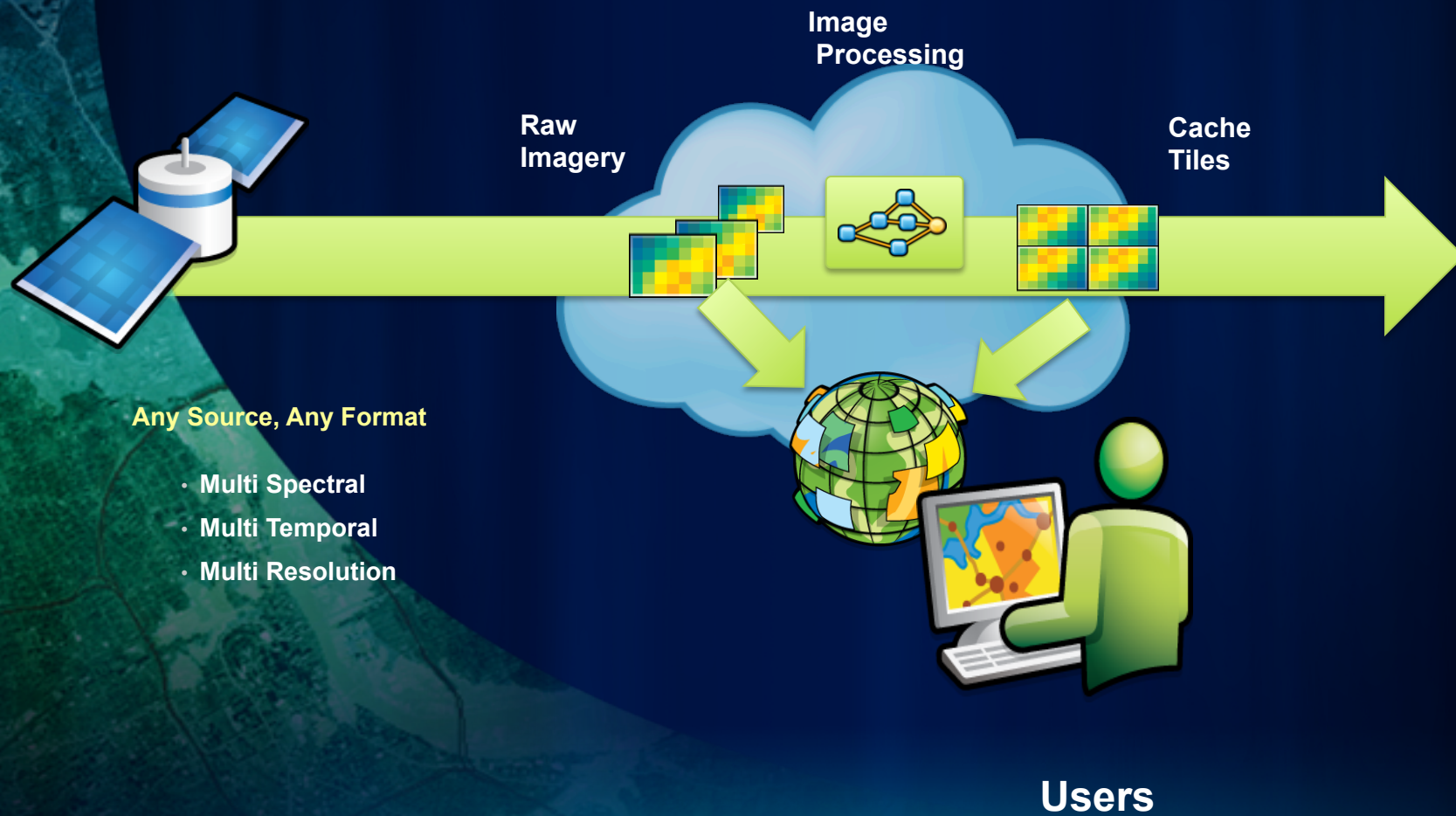
Online Viewing and easy temporal Comparisons



new

... Complete Coverage for 1975, 1990, 2000, 2005, 2010

Cloud Image Processing and Services



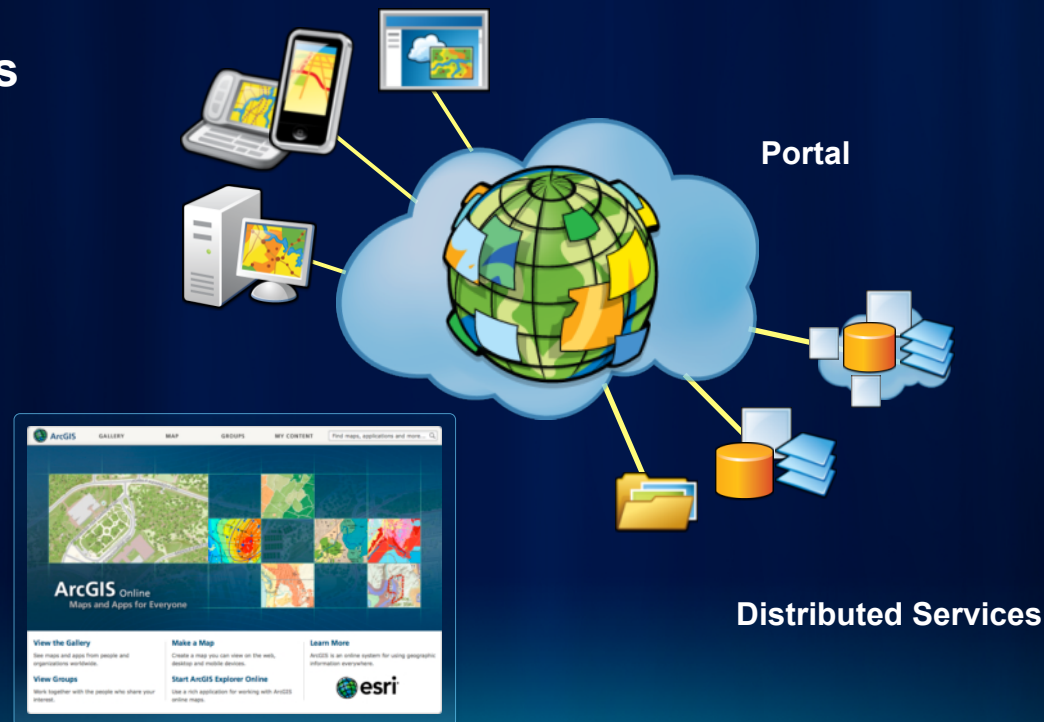
The Next Big Step



Online GIS is Connecting Everything

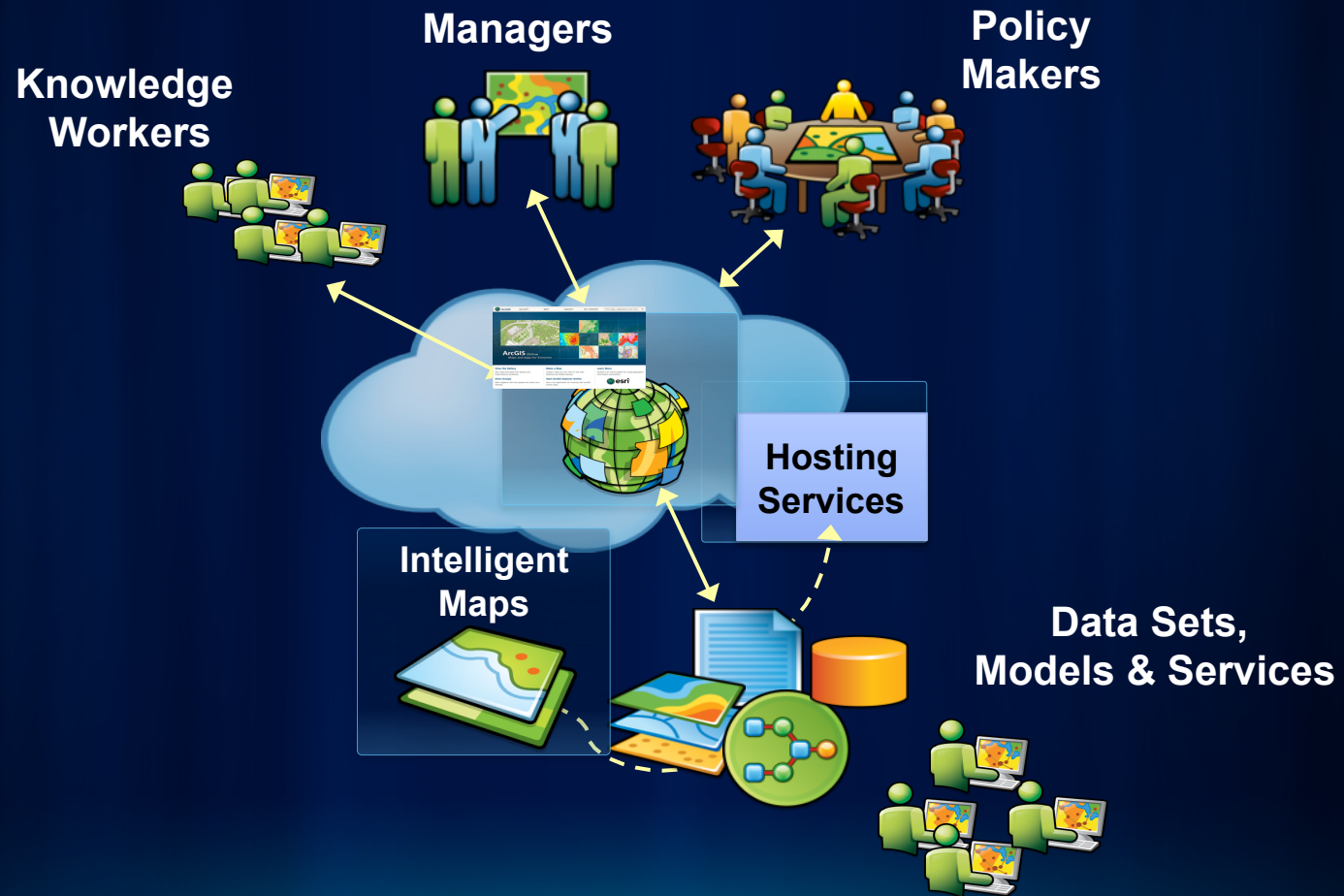
Cloud Based

- Basemaps
- Shared user maps and apps
- Viewers
- Open APIs
- Mashups
- Hosting



Online GIS Can Unlock Geospatial Assets

Improving and Accelerating Decision Making . . .



. . . Supporting Mission Priorities

The Future Of Our Field Will Be Strong

Extending Geospatial to Make a Better World



... Leveraging Our Collective Knowledge and Resources